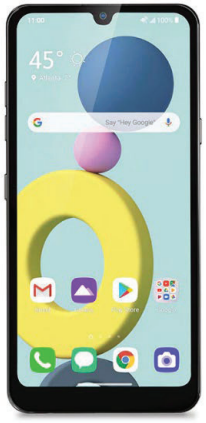
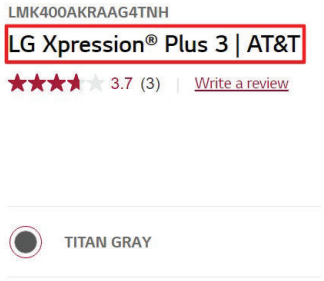
Exhibit 5 – U.S. Patent No. 10,855,087 Claim Chart

Claim	Analysis (All Emphasis Added)
[1.P] A power supply system comprising: power circuitry configured to provide direct current power.	LG makes, uses, sells, offers for sale and imports a power supply system comprising power circuitry configured to provide direct current power. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, LG provides cell phones ("portable electronic device") including but not limited to LG G7 fit, LG G8X Thin Dual Screen, LG K30, LG K51, LG K92, LG Phoenix 4, LG Prime 2, LG Q70, LG Q70, LG Stylo 5x, LG Stylo 6, LG V30, LG V35 ThinQ, LG V40 ThinQ, LG V60 ThinQ 5G Dual Screen, LG VELVET 5G, LG WING 5G, LG Xpression Plus 3, LG V40 5G, LG V40 Lite, LG V50S ThinQ 5G, and LG V50 ThinQ 5G. LG provides a Travel Power Adapter that ships with the phones and acts as a power supply while charging the phone. The adapter outputs voltage, current, and power values. Upon information and belief, the Travel Power Adapter uses the Battery Charging (BC) 1.2 specification to charge the portable electronic device. The Table 2-1 (https://www.usb.org/sites/default/files/USB%20Type-C%20Spec%20R2.0%20-%20August%202019.pdf, page 36) and the diagram depicting the power consumed by different USB specifications (https://usb.org/sites/default/files/D2T2-1%20-%20USB%20Power%20Delivery.pdf, page 5) disclose that BC 1.2 is used to output 5V voltage, 1.5A current, and 7.5W power. The voltage and current values mentioned on the Travel Power Adapter correspond to output voltage and current of 5V and 1.2A respectively. Hence, the adapter charges the portable electronic device using the BC 1.2 specification.

Claim	Analysis (All Emphasis Added)
	  Source: https://www.lg.com/us/cell-phones/lg-lmk400akraag4tnh-att-xpression-plus-3

Claim	Analysis (All Emphasis Added)
	 Source: https://www.youtube.com/watch?v=gthOrpIz16Y (at 7:08)

Claim	Analysis (All Emphasis Added)
	TECHNICAL SPECIFICATIONS Platform — Android™ 10 Battery Capacity — 3,500 mAh (non-removable) Charging — USB Type C RAM — 2 GB * — Actual battery time may vary depending on network connectivity and application use. Source: https://www.lg.com/us/cell-phones/lg-lmk400akraag4tnh-att-xpression-plus-3

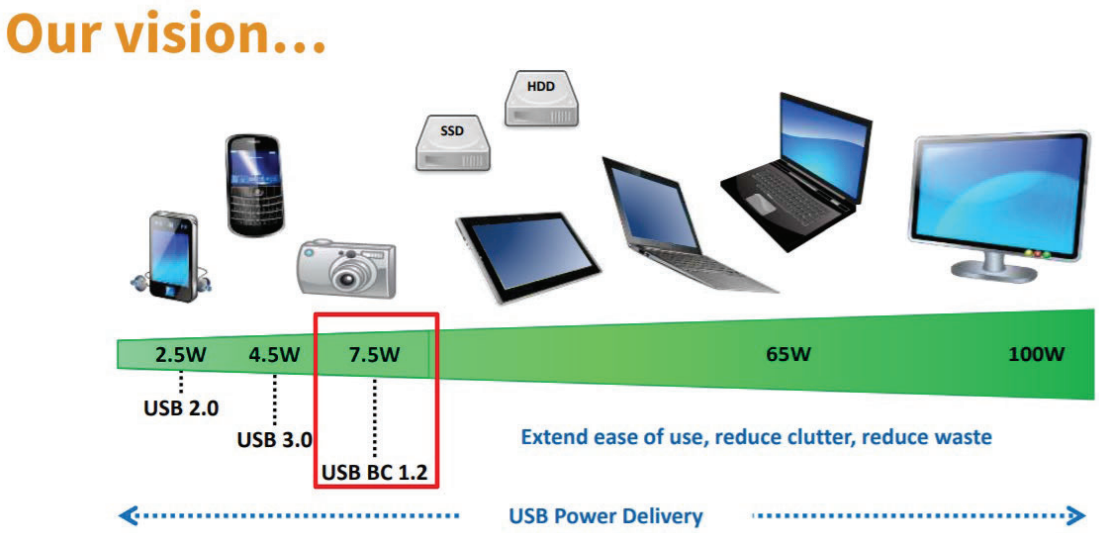
Claim	Analysis (All Emphasis Added)

Table 2-1 Summary of power supply options

Mode of Operation	Voltage	Current	Notes
USB 2.0	5 V	See *USB 2.0*	
USB 3.2	5 V	See *USB 3.2*	
USB4	5 V	1.5 A	See Section 5.3.
USB BC 1.2	5 V	1.5 A[1]	Legacy charging
USB Type-C Current @ 1.5 A	5 V	1.5 A	Supports higher power devices
USB Type-C Current @ 3.0 A	5 V	3 A	Supports higher power devices
USB PD	Configurable up to 20 V	Configurable up to 5 A	Directional control and power level management

Source:https://www.usb.org/sites/default/files/USB%20Type-C%20Spec%20R2.0%20-%20August%202019.pdf, page 36

Claim	Analysis (All Emphasis Added)
	USB battery charging specifications Battery Charging Specification Revision 1.2 (BC1.2) The different port types described in the above section were first defined in the *Battery Charging Specification Revision 1.2* (BC1.2) published in 2010. In addition to the port definitions, BC1.2 specifies primary and secondary charge port detection sequences and port specific performance requirements. These include required operating range, undershoot, detection signaling, and connectors for each port type. Also included are dead, weak, and good battery charge conditions, port shutdown procedures, and other details associated with battery charging. BC1.2 was published after USB 2.0 but before USB 3.1 and so the information in BC1.2 refers to USB 2.0. The specification is, however, consistent and compatible with USB 3.1. Source: https://www.lightingglobal.org/wp-content/uploads/2017/12/Issue-24_USB-smartphone-charging-final.pdf, page 4

Claim	Analysis (All Emphasis Added)
	 Source: https://usb.org/sites/default/files/D2T2-1%20-%20USB%20Power%20Delivery.pdf, page 5

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

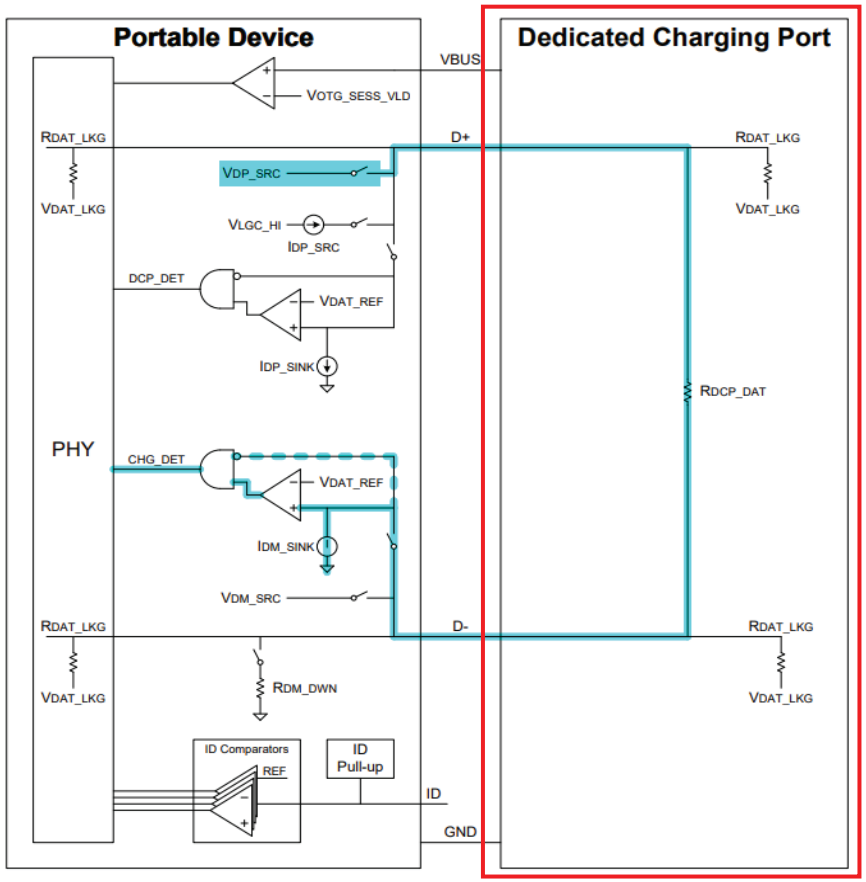
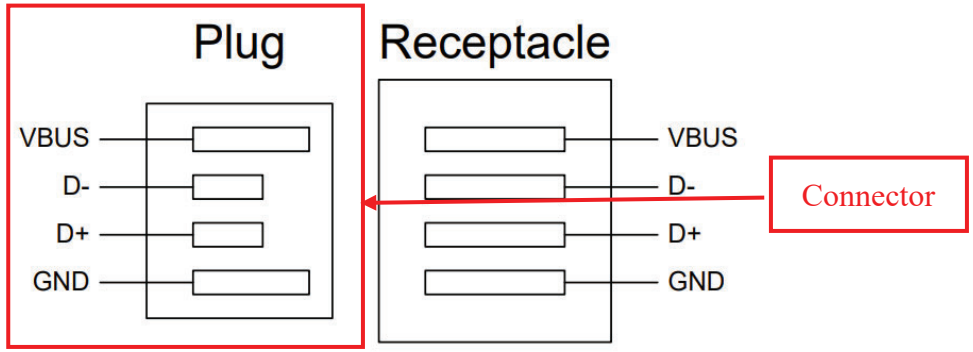


Figure 3-6 Primary Detection, DCP

Adapter

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 Further, to charge the battery in a portable electronic device, the portable electronic device is connected to the Travel Power Adapter. The other end of the USB cable is connected to the charging port of the phone and the adapter is plugged into a standard wall socket. Therefore, the Travel Power Adapter comprises power circuitry to provide DC power to the phones.
[1.1] data circuitry configured to receive a first signal that originates from a portable electronic device and to provide a second signal to be sent to the portable electronic device, the data circuitry and the power circuitry configured to be coupled via a connector to the portable electronic device, the connector comprising a first conductor, a second conductor, a third conductor, and a fourth conductor, the connector configured to be detachably mated with a power input interface of	LG provides a power supply system comprising data circuitry configured to receive a first signal that originates from a portable electronic device and to provide a second signal to be sent to the portable electronic device, the data circuitry and the power circuitry configured to be coupled via a connector to the portable electronic device, the connector comprising a first conductor, a second conductor, a third conductor, and a fourth conductor, the connector configured to be detachably mated with a power input interface of the portable electronic device. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Travel Power Adapter comprises data circuitry configured to use the Primary Detection method as described in the USB BC 1.2 specification. The Travel Power Adapter connects to the portable electronic device through a USB cable. The USB cable has a USB-C connector at one end to detachably mate with the charging port of portable electronic device. The connector comprises VBUS (“first conductor”), GND (“second conductor”), D+ (“third conductor”) and D- (“fourth conductor”) pins. Further, during Primary Detection, when a portable electronic device is connected with the Travel Power Adapter through the USB cable, the portable electronic device generates a D+ signal (“first signal”). Data circuitry of the Travel Power Adapter receives the D+ signal (“first signal”) and provides a D- signal (“second signal”) to the portable electronic device to detect the type of connected adapter (standard downstream port or charging port).

Claim	Analysis (All Emphasis Added)
the portable electronic device to	**1.2 Background** The USB ports on personal computers are convenient places for Portable Devices (PDs) to draw current for charging their batteries. This convenience has led to the creation of USB Chargers that simply expose a USB standard-A receptacle. This allows PDs to use the same USB cable to charge from either a PC or from a USB Charger. If a PD is attached to a USB host or hub, then the USB 2.0 specification requires that after connecting, a PD must draw less than: • 2.5 mA average if the bus is suspended • 100 mA if bus is not suspended and not configured • 500 mA if bus is not suspended and configured for 500 mA If a PD is attached to a Charging Port, (i.e. CDP, DCP, ACA-Dock or ACA), then it is allowed to draw IDEV_CHG without having to be configured or follow the rules of suspend. In order for a PD to determine how much current it is allowed to draw from an upstream USB port, there need to be mechanisms that allow the PD to distinguish between a Standard Downstream Port and a Charging Port. This specification defines just such mechanisms. Since PDs can be attached to USB chargers from various manufacturers, it is important that all provide an acceptable user experience. This specification defines the requirements for a compliant USB charger, which is referred to in this spec as a USB Charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 1

Claim	Analysis (All Emphasis Added)
	3.2.3.2 Problem Description USB plugs and receptacles are designed such that when the plug is inserted into the receptacle, the power pins make contact before the data pins make contact. This is illustrated in Figure 3-3.  **Figure 3-3 Data Pin Offset** Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 10

Claim	Analysis (All Emphasis Added)

3. Charging Port Detection

3.1 Overview

Figure 3-1 shows several examples of a PD attached to an SDP or Charging Port.

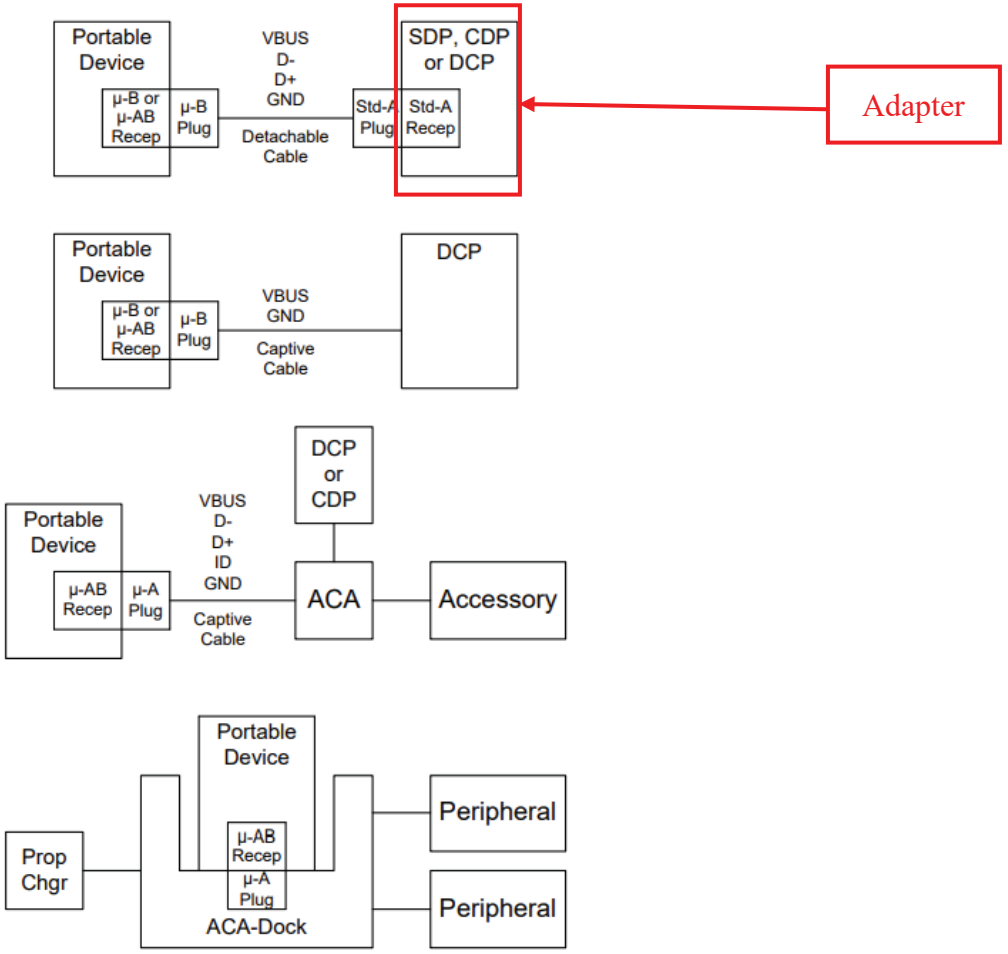


Figure 3-1 System Overview

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 6

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

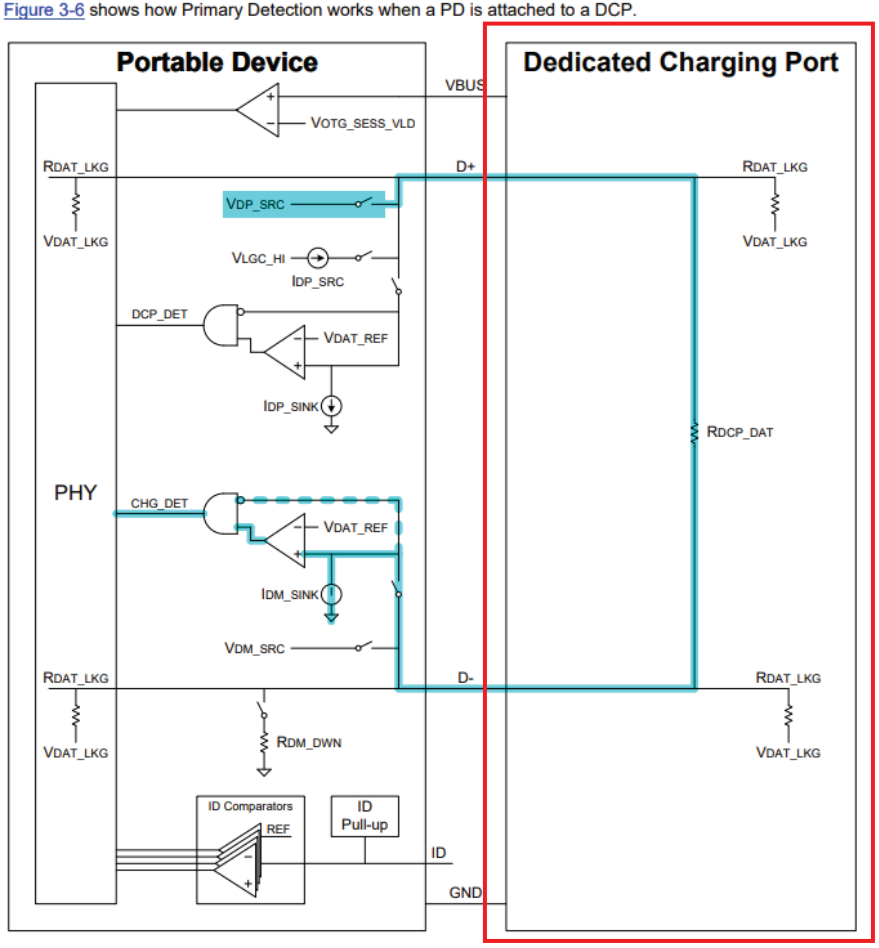


Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 During Primary Detection the PD shall turn on V_{DP_SRC} and I_{DM_SINK}. Since a DCP is required to short D+ to D- through a resistance of R_{DCP_DAT}, the PD will detect a voltage on D- that is close to V_{DP_SRC}. A PD shall compare the voltage on D- with V_{DAT_REF}. If D- is greater than V_{DAT_REF}, then the PD is allowed to detect that it is attached to either a DCP or CDP. A PD is optionally allowed to compare D- with V_{LGC} as well, and only determine that it is attached to a DCP or CDP if D- is greater than V_{DAT_REF}, but less than V_{LGC}. The reason for this option is as follows. PS2 ports pull D+/- high. If a PD is attached to a PS2 port, and the PD only checks for D- greater than V_{DAT_REF}, then a PD attached to a PS2 port would determine that it is attached to a DCP or CDP and proceed to draw I_{DEV_CHG}. This much current could potentially damage a PS2 port. By only determining it is attached to DCP or CDP if D- is less than V_{LGC}, the PD can avoid causing damage to a PS2 port. On the other hand, some proprietary chargers also pull D+/- high. If a PD is attached to one of these chargers, and it determined it was not attached to a charger because D- was greater than V_{LGC}, then the PD would determine that it was attached to an SDP, and only be able to draw I_{SUSP}. The choice of whether or not to compare D- to V_{LGC} depends on whether the PD is more likely to be attached to a PS2 port, or to a proprietary charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 15

Claim	Analysis (All Emphasis Added)

> MINI & MICRO USB CONNECTOR PIN CONNECTIONS

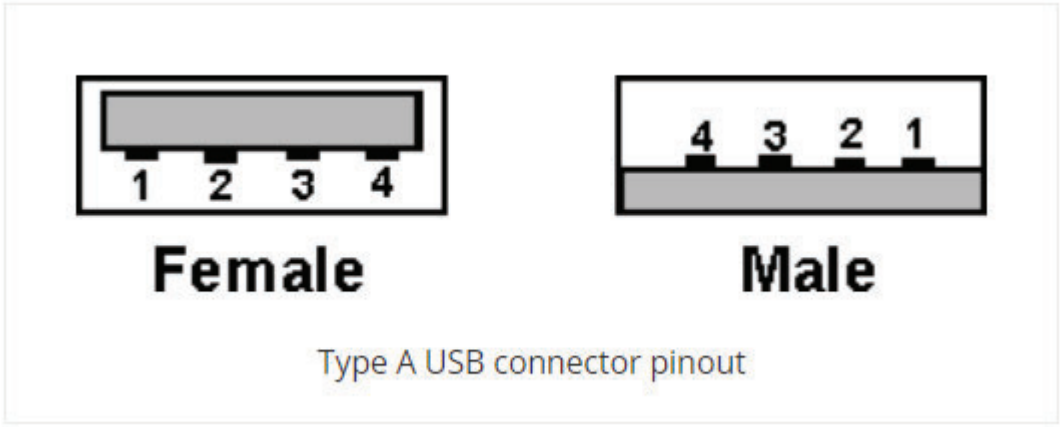
PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4		Not connected, although it can sometimes be ground or used as a presence indicator.
5	Black	Ground
Shell	Drain wire	Shield

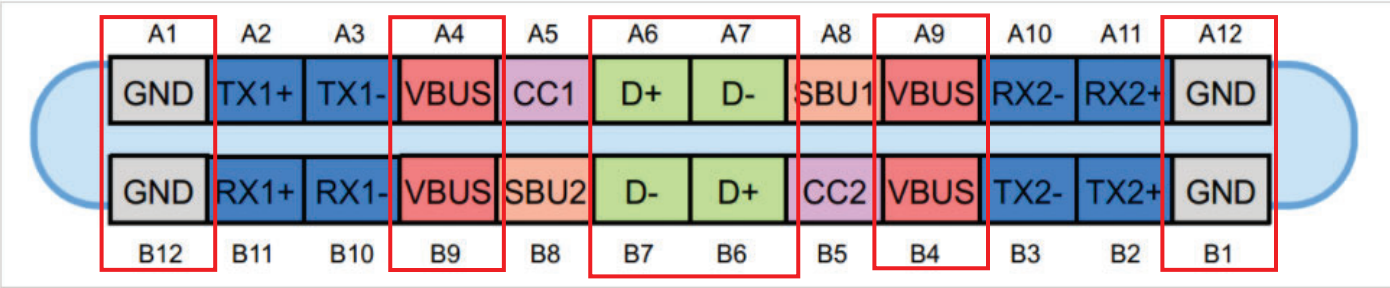
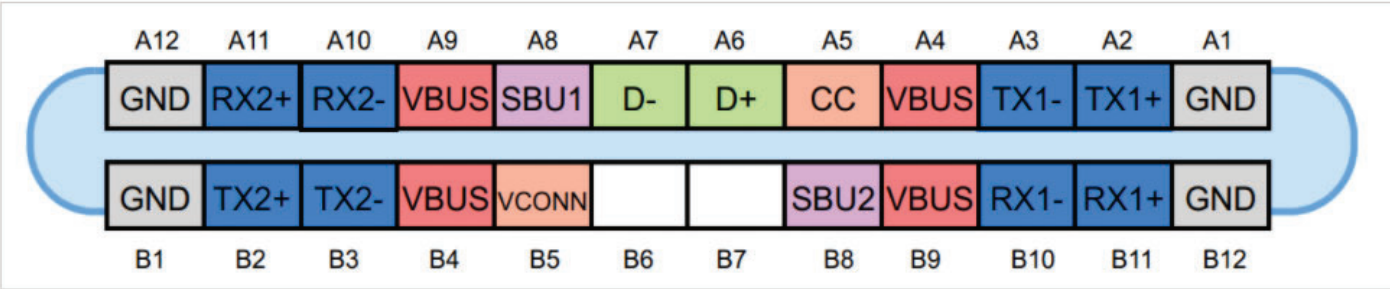
Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

TYPE A & B USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 ***Figure 1.*** *The USB Type-C receptacle. Image courtesy of Microchip.*  ***Figure 2.*** *The USB Type-C plug. Image courtesy of Microchip.* Source: https://www.allaboutcircuits.com/technical-articles/introduction-to-usb-type-c-which-pins-power-delivery-data-transfer/
[1.2] transfer, via the first conductor, the direct current power to the portable electronic device.	LG provides a power supply system to transfer, via the first conductor, the direct current power to the portable electronic device. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the VBUS pin is the voltage line that provides DC power to the portable electronic device.

Claim	Analysis (All Emphasis Added)

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

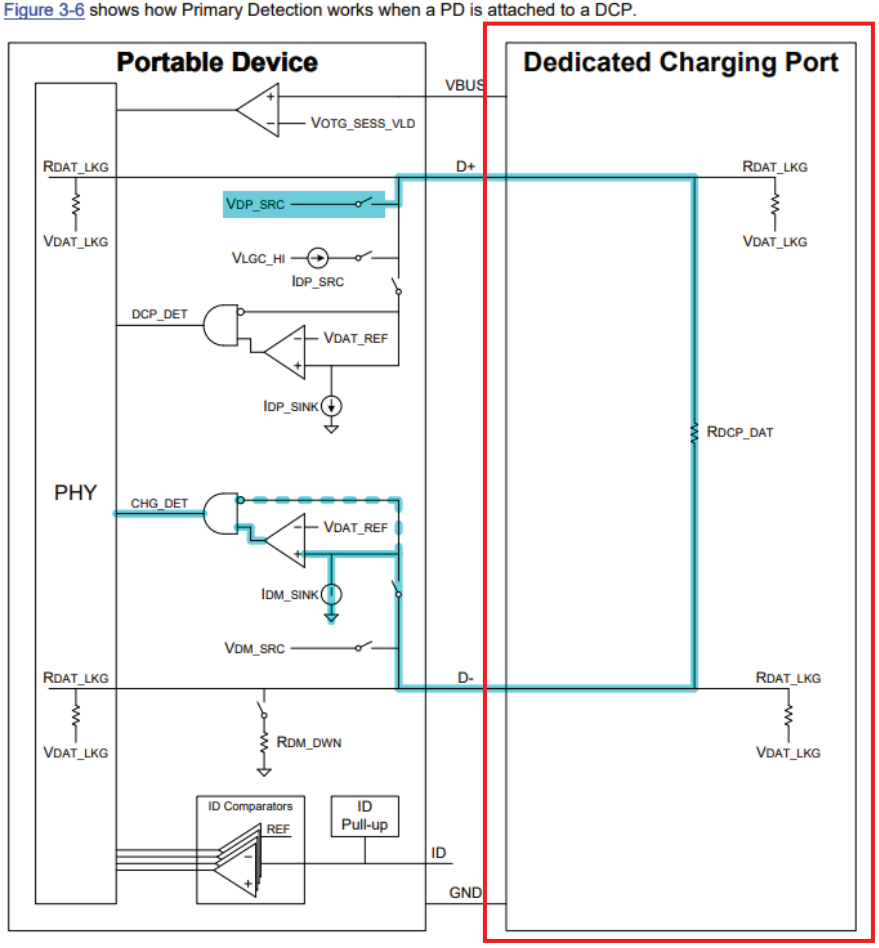


Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 **Acronyms** ACA Accessory Charger Adapter CDP Charging Downstream Port DBP Dead Battery Provision DCD Data Contact Detect DCP Dedicated Charging Port FS Full Speed HS High-Speed LS Low-Speed OTG On-The-Go PC Personal Computer PD Portable Device PHY Physical Layer Interface for High-Speed USB PS2 Personal System 2 SDP Standard Downstream Port SRP Session Request Protocol TPL Targeted Peripheral List USB Universal Serial Bus USBCV USB Command Verifier USB-IF USB Implementers Forum VBUS Voltage line of the USB interface Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page xi

Claim	Analysis (All Emphasis Added)

> MINI & MICRO USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4		Not connected, although it can sometimes be ground or used as a presence indicator.
5	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

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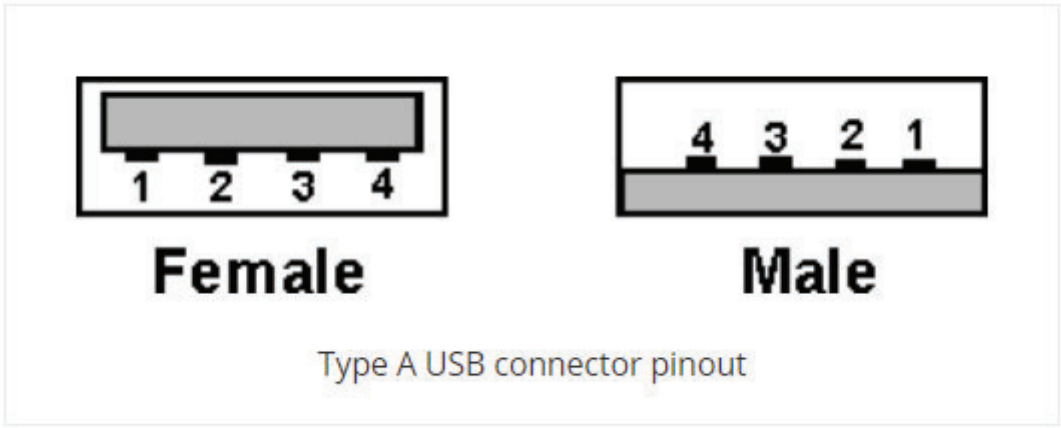
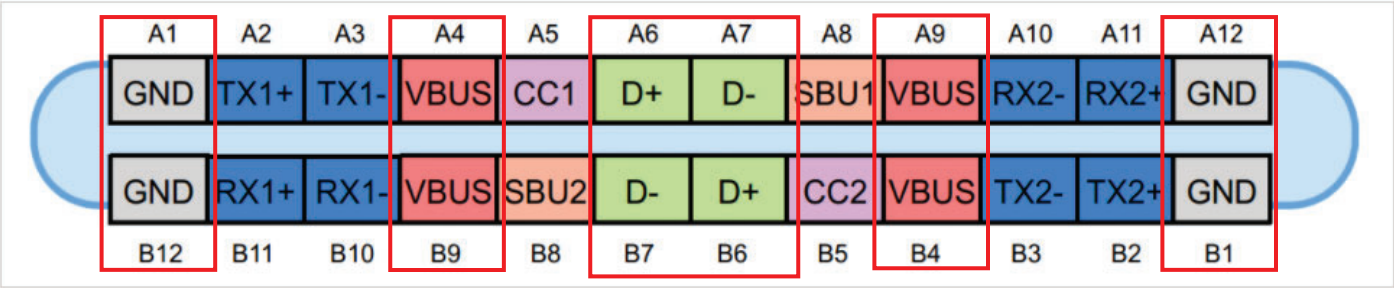
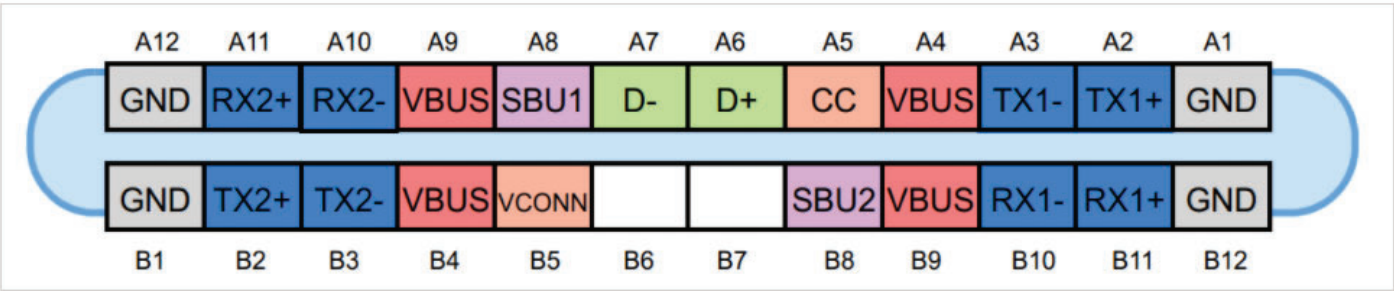
TYPE A & B USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 ***Figure 1.*** *The USB Type-C receptacle. Image courtesy of Microchip.*  ***Figure 2.*** *The USB Type-C plug. Image courtesy of Microchip.* Source: https://www.allaboutcircuits.com/technical-articles/introduction-to-usb-type-c-which-pins-power-delivery-data-transfer/
[1.3] transfer, via the second conductor, a ground reference to the portable electronic device.	LG provides a power supply system to transfer, via the second conductor, a ground reference to the portable electronic device. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the GND pin provides a ground reference to the portable electronic device.

Claim	Analysis (All Emphasis Added)
	3.5 Ground Current and Noise Margins As shown in Figure 7-47 of the USB 2.0 specification, a current of 100 mA through the ground wire of a USB cable can result in a voltage difference of 25 mV between the host ground and the device ground. This ground difference has the effect of reducing noise margins for both signaling and charger detection. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 36

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

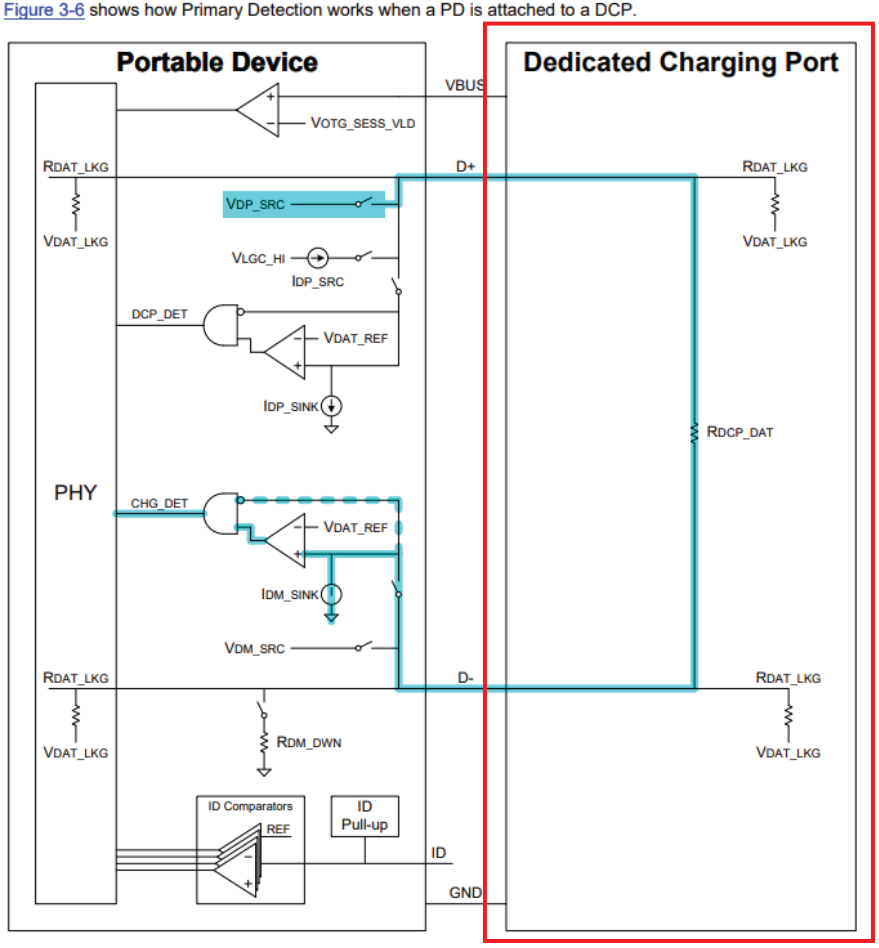


Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)

Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14

> MINI & MICRO USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4		Not connected, although it can sometimes be ground or used as a presence indicator.
5	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

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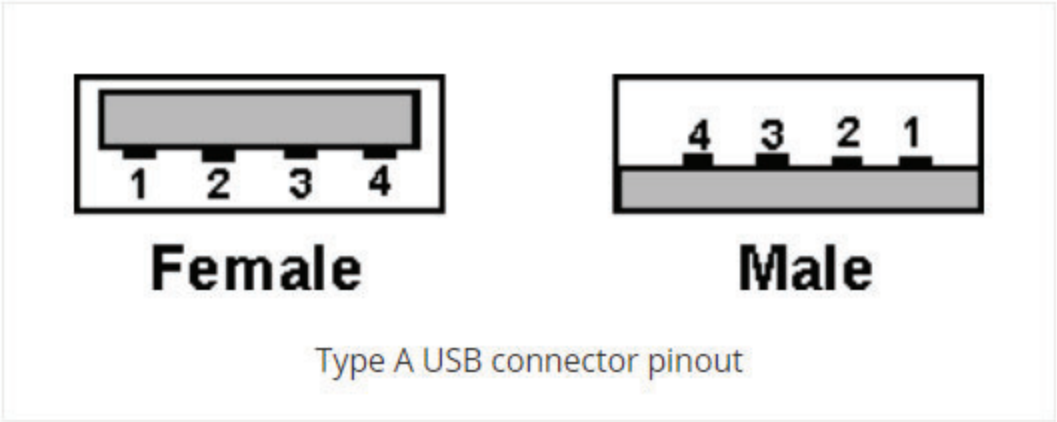
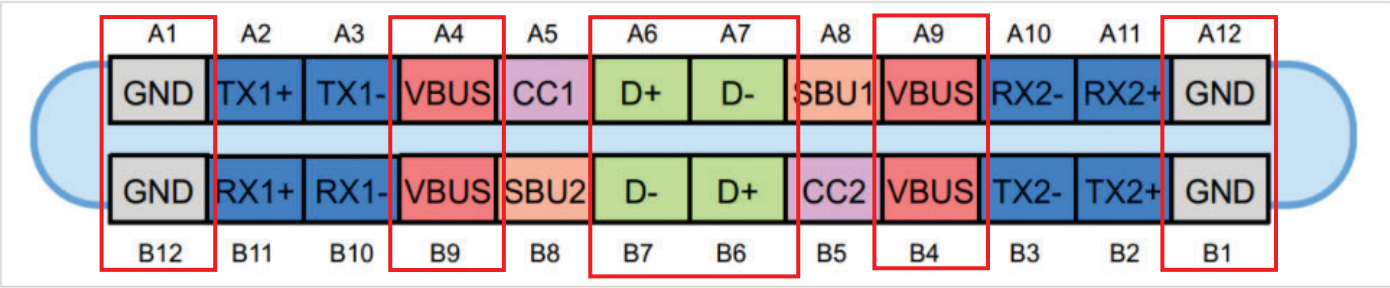
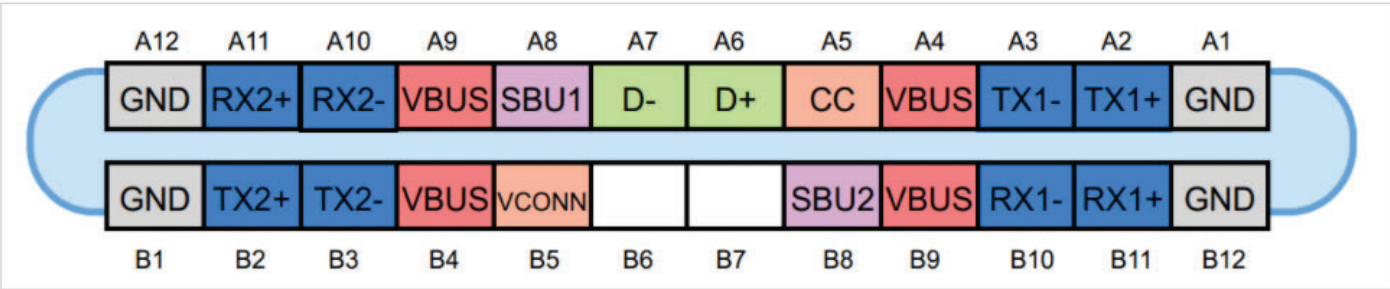
TYPE A & B USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4	Black	Ground
Shell	Drain wire	Shield

Claim	Analysis (All Emphasis Added)
	Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php  Type A USB connector pinout Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 ***Figure 1.*** *The USB Type-C receptacle. Image courtesy of Microchip.*  ***Figure 2.*** *The USB Type-C plug. Image courtesy of Microchip.* Source: https://www.allaboutcircuits.com/technical-articles/introduction-to-usb-type-c-which-pins-power-delivery-data-transfer/
[1.4] transfer, via the third conductor, the first signal from the portable electronic device to the data circuitry, and	LG provides a power supply system to transfer, via the third conductor, the first signal from the portable electronic device to the data circuitry. This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Claim	Analysis (All Emphasis Added)
	For example, the D+ pin provides the D+ signal (“first signal”) from the portable electronic device to the data circuitry of the Travel Power Adapter.

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

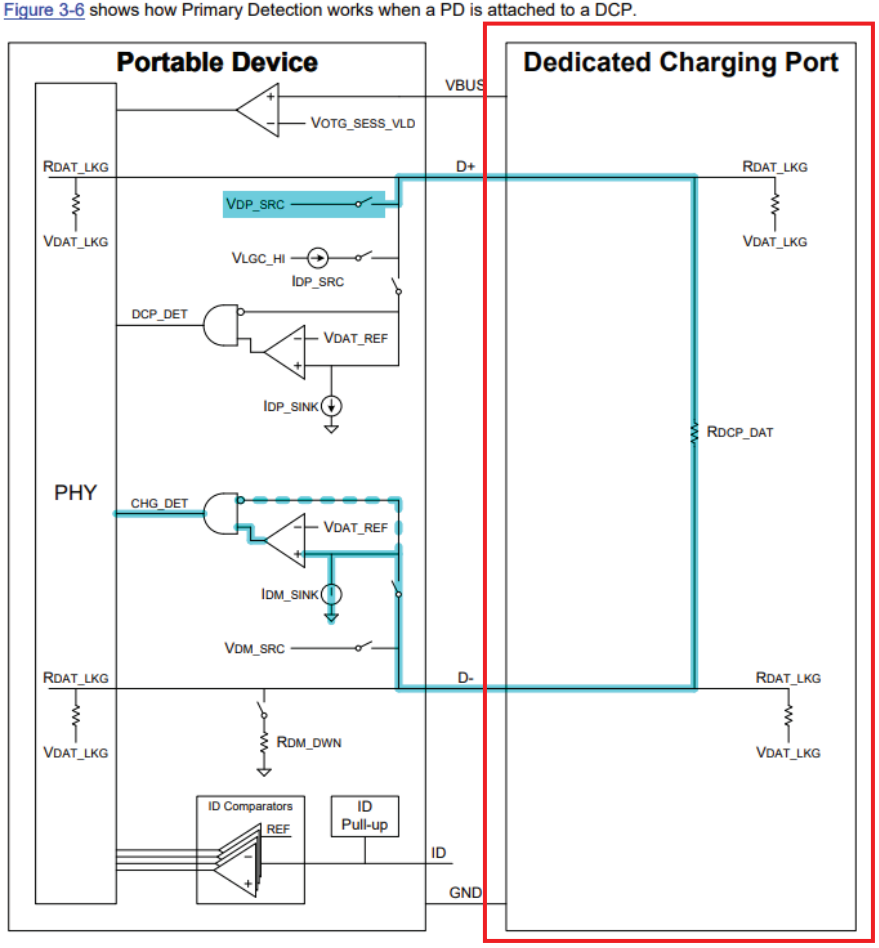


Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 During Primary Detection the PD shall turn on V_{DP_SRC} and I_{DM_SINK}. Since a DCP is required to short D+ to D- through a resistance of R_{DCP_DAT}, the PD will detect a voltage on D- that is close to V_{DP_SRC}. A PD shall compare the voltage on D- with V_{DAT_REF}. If D- is greater than V_{DAT_REF}, then the PD is allowed to detect that it is attached to either a DCP or CDP. A PD is optionally allowed to compare D- with V_{LGC} as well, and only determine that it is attached to a DCP or CDP if D- is greater than V_{DAT_REF}, but less than V_{LGC}. The reason for this option is as follows. PS2 ports pull D+/- high. If a PD is attached to a PS2 port, and the PD only checks for D- greater than V_{DAT_REF}, then a PD attached to a PS2 port would determine that it is attached to a DCP or CDP and proceed to draw I_{DEV_CHG}. This much current could potentially damage a PS2 port. By only determining it is attached to DCP or CDP if D- is less than V_{LGC}, the PD can avoid causing damage to a PS2 port. On the other hand, some proprietary chargers also pull D+/- high. If a PD is attached to one of these chargers, and it determined it was not attached to a charger because D- was greater than V_{LGC}, then the PD would determine that it was attached to an SDP, and only be able to draw I_{SUSP}. The choice of whether or not to compare D- to V_{LGC} depends on whether the PD is more likely to be attached to a PS2 port, or to a proprietary charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 15

Claim	Analysis (All Emphasis Added)

> MINI & MICRO USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4		Not connected, although it can sometimes be ground or used as a presence indicator.
5	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

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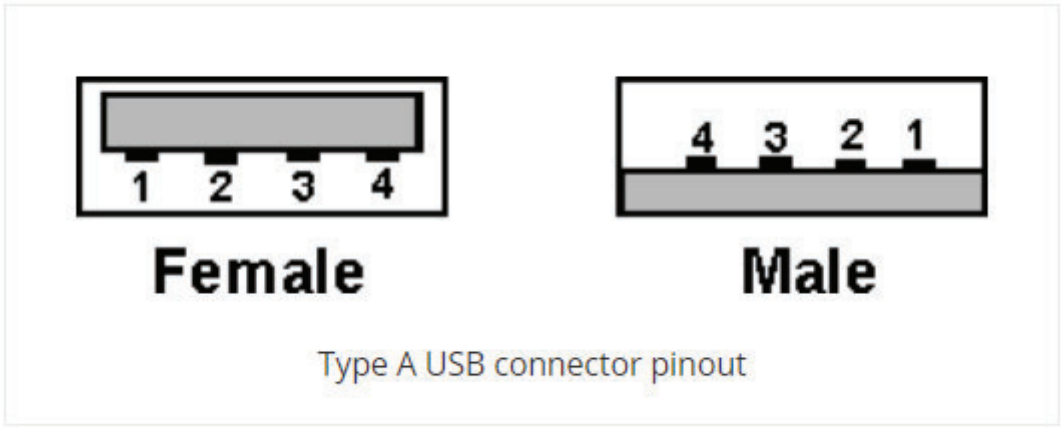
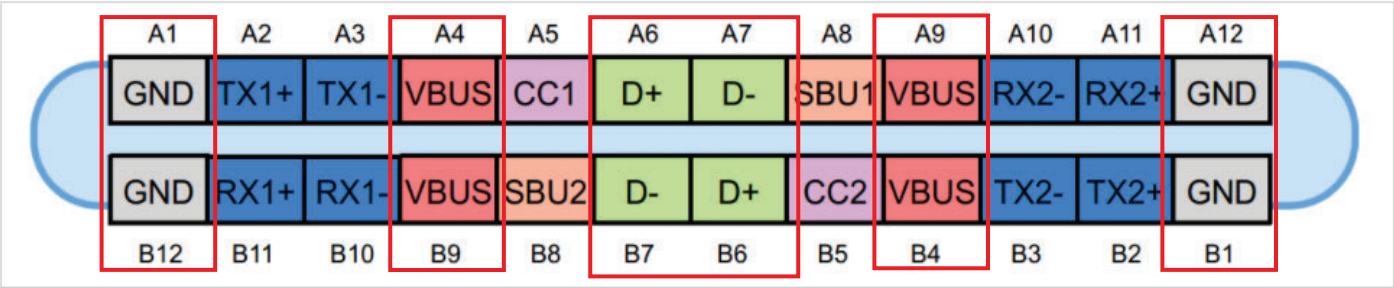
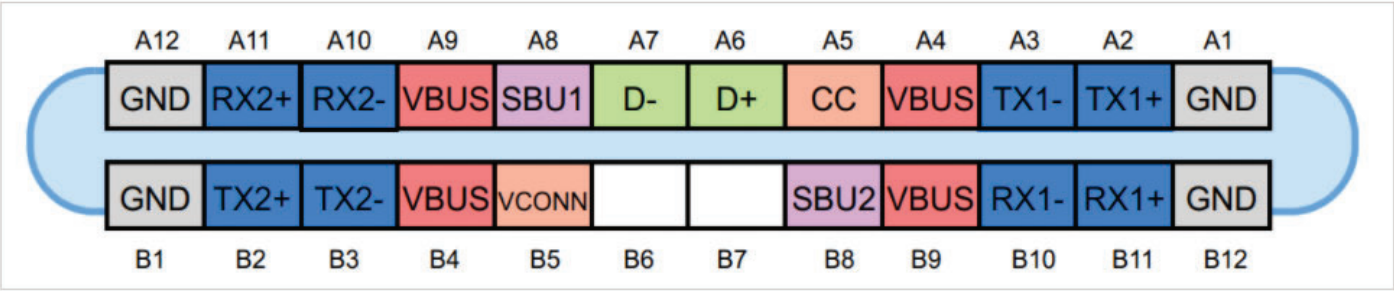
TYPE A & B USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
1	Red	Vbus (4.75 - 5.25 V)
2	White	Data -
3	Green	Data +
4	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 ***Figure 1.*** *The USB Type-C receptacle. Image courtesy of Microchip.*  ***Figure 2.*** *The USB Type-C plug. Image courtesy of Microchip.* Source: https://www.allaboutcircuits.com/technical-articles/introduction-to-usb-type-c-which-pins-power-delivery-data-transfer/
[1.5] transfer, via the fourth conductor, the second signal from the data circuitry to the portable electronic device;	LG provides a power supply system to transfer, via the fourth conductor, the second signal from the data circuitry to the portable electronic device. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the D- pin provides the D- signal ("second signal") from the data circuitry of the Travel Power Adapter to the portable electronic device.

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

Primary Detection is used to distinguish between an SDP and different types of Charging Ports. A PD is required to implement Primary Detection.

3.2.4.1 Primary Detection, DCP

Figure 3-6 shows how Primary Detection works when a PD is attached to a DCP.

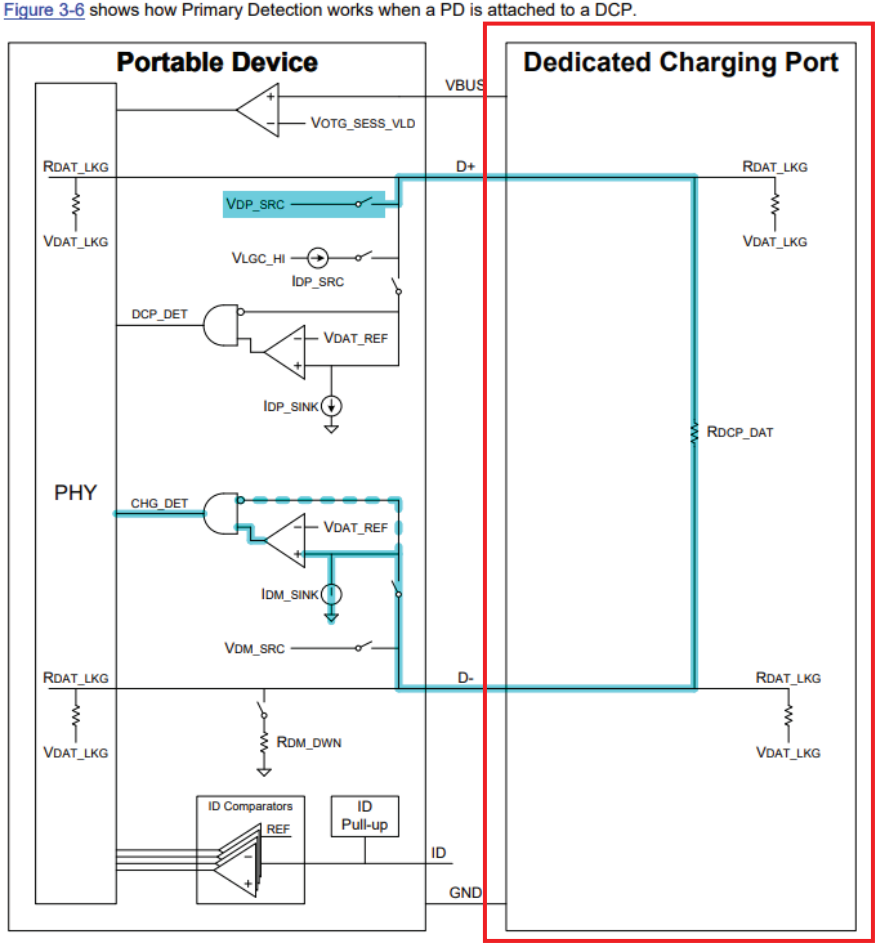


Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 During Primary Detection the PD shall turn on V_{DP_SRC} and I_{DM_SINK}. Since a DCP is required to short D+ to D- through a resistance of R_{DCP_DAT}, the PD will detect a voltage on D- that is close to V_{DP_SRC}. A PD shall compare the voltage on D- with V_{DAT_REF}. If D- is greater than V_{DAT_REF}, then the PD is allowed to detect that it is attached to either a DCP or CDP. A PD is optionally allowed to compare D- with V_{LGC} as well, and only determine that it is attached to a DCP or CDP if D- is greater than V_{DAT_REF}, but less than V_{LGC}. The reason for this option is as follows. PS2 ports pull D+/- high. If a PD is attached to a PS2 port, and the PD only checks for D- greater than V_{DAT_REF}, then a PD attached to a PS2 port would determine that it is attached to a DCP or CDP and proceed to draw I_{DEV_CHG}. This much current could potentially damage a PS2 port. By only determining it is attached to DCP or CDP if D- is less than V_{LGC}, the PD can avoid causing damage to a PS2 port. On the other hand, some proprietary chargers also pull D+/- high. If a PD is attached to one of these chargers, and it determined it was not attached to a charger because D- was greater than V_{LGC}, then the PD would determine that it was attached to an SDP, and only be able to draw I_{SUSP}. The choice of whether or not to compare D- to V_{LGC} depends on whether the PD is more likely to be attached to a PS2 port, or to a proprietary charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 15

Claim	Analysis (All Emphasis Added)

> MINI & MICRO USB CONNECTOR PIN CONNECTIONS

PIN	WIRE COLOUR	SIGNAL NAMES
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2	White	Data -
3	Green	Data +
4		Not connected, although it can sometimes be ground or used as a presence indicator.
5	Black	Ground
Shell	Drain wire	Shield

Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

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TYPE A & B USB CONNECTOR PIN CONNECTIONS

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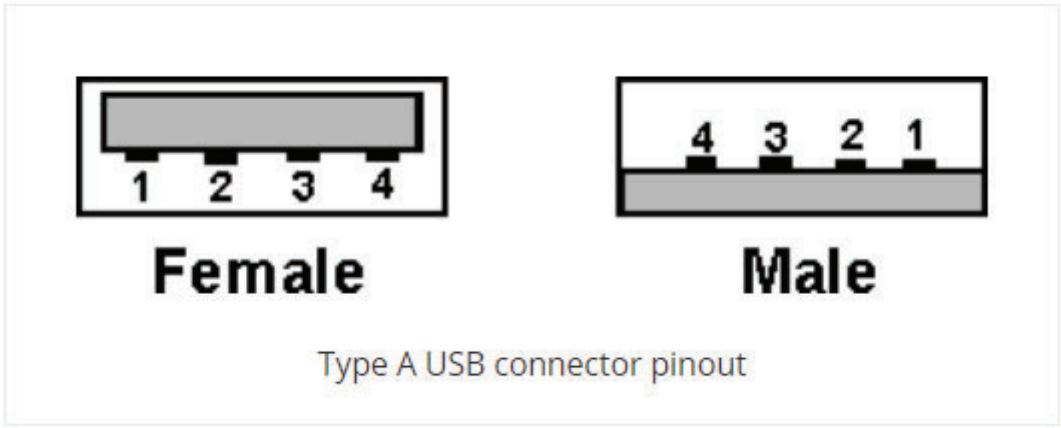
Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)
	 Source: https://www.electronics-notes.com/articles/connectivity/usb-universal-serial-bus/connectors-pinouts-cables.php

Claim	Analysis (All Emphasis Added)

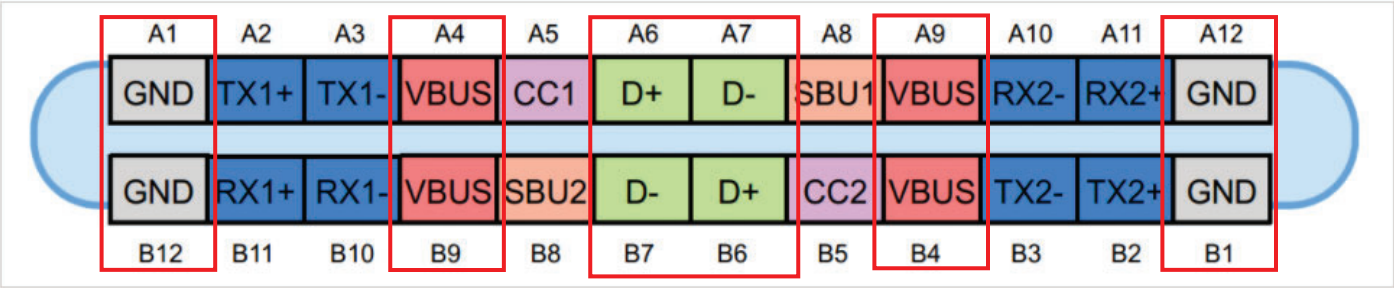


Figure 1. *The USB Type-C receptacle. Image courtesy of Microchip.*

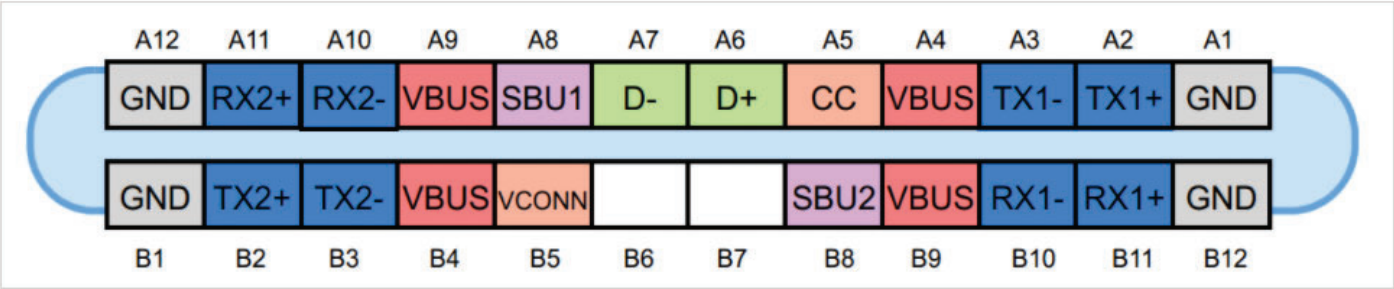


Figure 2. *The USB Type-C plug. Image courtesy of Microchip.*

Source: https://www.allaboutcircuits.com/technical-articles/introduction-to-usb-type-c-which-pins-power-delivery-data-transfer/

Claim	Analysis (All Emphasis Added)
[1.6] wherein the data circuitry is further configured, in coordination with the first signal, to provide the second signal, the second signal having a parameter level that is usable by the portable electronic device in connection with control of charging a rechargeable battery of the portable electronic device based on the direct current power provided by the power circuitry.	LG provides a power supply system wherein the data circuitry is further configured, in coordination with the first signal, to provide the second signal, the second signal having a parameter level that is usable by the portable electronic device in connection with control of charging a rechargeable battery of the portable electronic device based on the direct current power provided by the power circuitry. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Travel Power Adapter shorts the D+ to D- through a resistance of RDCP_DAT, such that the portable electronic device detects a voltage on D-. Therefore, the data circuitry of the adapter is configured, in coordination with the D+ signal ("first signal") to provide D- signal ("second signal") to the portable electronic device. Further, the portable electronic device compares the D- signal's voltage ("parameter") level with a reference voltage to detect the type of adapter (standard downstream port or charging port). Based on the type of adapter, the portable electronic devices draw current to charge a rechargeable battery of the portable electronic device from the direct current power provided by the adapter.

Claim	Analysis (All Emphasis Added)
	1.1 Scope The Battery Charging Working Group is chartered with creating specifications that define limits as well as detection, control and reporting mechanisms to permit devices to draw current in excess of the USB 2.0 specification for charging and/or powering up from dedicated chargers, hosts, hubs and charging downstream ports. These mechanisms are backward compatible with USB 2.0 compliant hosts and peripherals. **1.2 Background** The USB ports on personal computers are convenient places for Portable Devices (PDs) to draw current for charging their batteries. This convenience has led to the creation of USB Chargers that simply expose a USB standard-A receptacle. This allows PDs to use the same USB cable to charge from either a PC or from a USB Charger. If a PD is attached to a USB host or hub, then the USB 2.0 specification requires that after connecting, a PD must draw less than: • 2.5 mA average if the bus is suspended • 100 mA if bus is not suspended and not configured • 500 mA if bus is not suspended and configured for 500 mA If a PD is attached to a Charging Port, (i.e. CDP, DCP, ACA-Dock or ACA), then it is allowed to draw IDEV_CHG without having to be configured or follow the rules of suspend. In order for a PD to determine how much current it is allowed to draw from an upstream USB port, there need to be mechanisms that allow the PD to distinguish between a Standard Downstream Port and a Charging Port. This specification defines just such mechanisms. Since PDs can be attached to USB chargers from various manufacturers, it is important that all provide an acceptable user experience. This specification defines the requirements for a compliant USB charger, which is referred to in this spec as a USB Charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 1

Claim	Analysis (All Emphasis Added)

Claim	Analysis (All Emphasis Added)

3.2.4 Primary Detection

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3.2.4.1 Primary Detection, DCP

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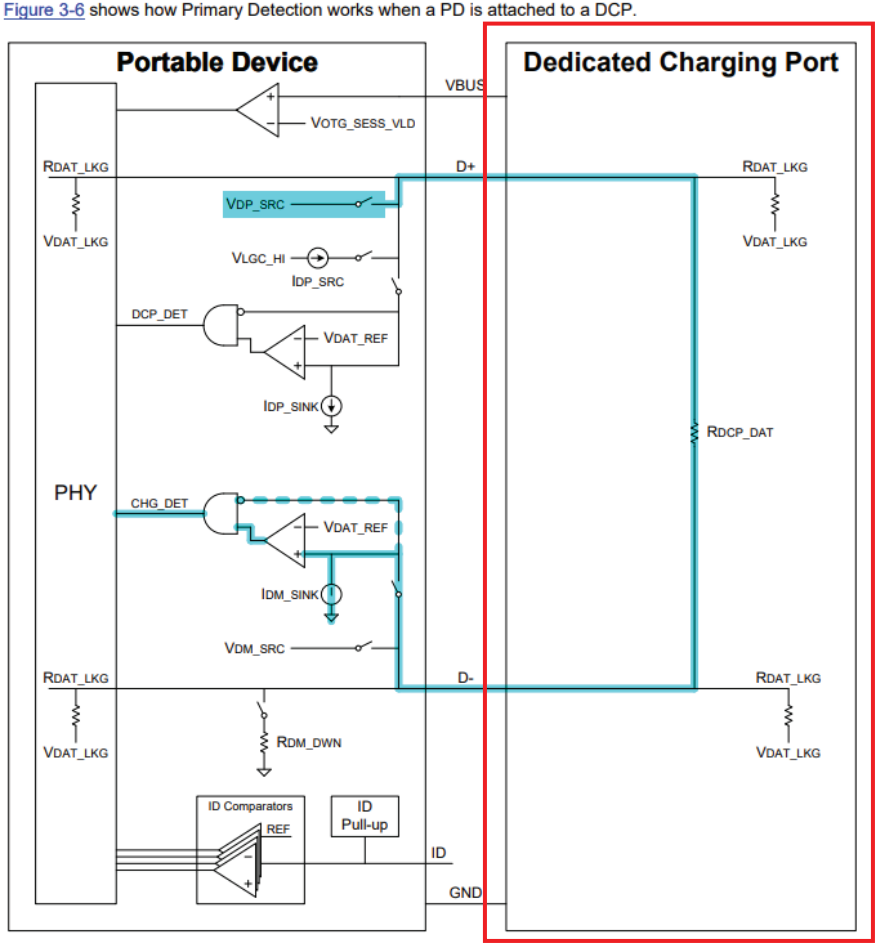

Figure 3-6 Primary Detection, DCP

Claim	Analysis (All Emphasis Added)
	Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 14 During Primary Detection the PD shall turn on V_{DP_SRC} and I_{DM_SINK}. Since a DCP is required to short D+ to D- through a resistance of R_{DCP_DAT}, the PD will detect a voltage on D- that is close to V_{DP_SRC}. A PD shall compare the voltage on D- with V_{DAT_REF}. If D- is greater than V_{DAT_REF}, then the PD is allowed to detect that it is attached to either a DCP or CDP. A PD is optionally allowed to compare D- with V_{LGC} as well, and only determine that it is attached to a DCP or CDP if D- is greater than V_{DAT_REF}, but less than V_{LGC}. The reason for this option is as follows. PS2 ports pull D+/- high. If a PD is attached to a PS2 port, and the PD only checks for D- greater than V_{DAT_REF}, then a PD attached to a PS2 port would determine that it is attached to a DCP or CDP and proceed to draw I_{DEV_CHG}. This much current could potentially damage a PS2 port. By only determining it is attached to DCP or CDP if D- is less than V_{LGC}, the PD can avoid causing damage to a PS2 port. On the other hand, some proprietary chargers also pull D+/- high. If a PD is attached to one of these chargers, and it determined it was not attached to a charger because D- was greater than V_{LGC}, then the PD would determine that it was attached to an SDP, and only be able to draw I_{SUSP}. The choice of whether or not to compare D- to V_{LGC} depends on whether the PD is more likely to be attached to a PS2 port, or to a proprietary charger. Source: https://www.usb.org/sites/default/files/BCv1.2_070312_0.zip, USB Battery Charging Specification (Including errata and ECNs through March 15, 2012), Revision 1.2, March 15, 2012, Page 15